REMARKS/ARGUMENTS:

Reconsideration of this application in light of the above amendments is courteously solicited.

Claims 1, 17 and 20 were rejected under 35 U.S.C. §102(b) as being clearly anticipated by EP 0872564, and claims 3 and 4 were rejected under 35 U.S.C. §102(b) as being anticipated by Cu based alloy compositions of EP 0872564.

The invention as claimed in claim 1 is directed to a copper base alloy consisting essentially of at least one of 8 to 45 wt% of zinc and 0.2 to 12.0 wt% of tin, 20 to 1000 ppm of carbon, and the balance being copper and unavoidable impurities. That is, the invention as claimed in claim 1 is directed to a Cu-Zn, Cu-Sn or Cu-Zn-Sn alloy (a copper base alloy which consists essentially of at least one of zinc and tin, and the balance being copper and unavoidable impurities), the Cu-Zn, Cu-Sn or Cu-Zn-Sn alloy containing a small amount of carbon.

As is well known, brasses containing zinc in copper have excellent characteristics, such as excellent workability and press punching quality and low costs, and are utilized as the materials of many electric parts, such as connectors. However, it is required to further improve the strength, spring characteristic, stress relaxation resistance and stress corrosion cracking resistance of brasses in order to cope with the miniaturization of parts and the deterioration of working environments. In such circumstances, there have been proposed methods for improving the above described characteristics by adding a predetermined amount of tin (Sn) to a Cu-Zn alloy. Such a Cu-Zn-Sn alloy is formed as a plate having a predetermined thickness usually by a method comprising the steps

of carrying out the longitudinal continuous casting, heating the obtained ingot by a heating furnace, extending the heated ingot by hot rolling, and thereafter, repeating cold rolling and annealing. Although the mechanical characteristics, such as tensile strength and 0.2% proof stress, stress relaxation resistance and stress corrosion cracking resistance of Cu-Zn-Sn alloys can be improved by the addition of Sn, it is desired to improve the hot workability thereof. That is, there are some cases where Cu-Zn-Sn alloys may be broken during hot rolling to deteriorate the surface quality and yields of products, so that it is desired to improve the hot workability of Cu-Zn-Sn alloys.

In order to obtain a Cu-Zn, Cu-Sn or Cu-Zn-Sn alloy having an improved hot workability, the inventors were diligently studied and attempted to cause such a copper base alloy to contain a small amount of carbon. Then, the inventors have found some methods for efficiently causing the copper base alloy (Cu-Zn, Cu-Sn or Cu-Zn-Sn alloy) to contain carbon although it is difficult to cause the copper base alloy to easily contain carbon since the degree of solid solution of carbon in copper is usually small and since the difference in specific gravity between carbon and copper is great. By such methods, the inventors have made a novel copper base alloy consisting essentially of at least one of 8 to 45 wt% of zinc and 0.2 to 12.0 wt% of tin, 20 to 1000 ppm of carbon, and the balance being copper and unavoidable impurities. Thus, the inventors have found that such a copper base alloy has a greatly improved hot workability.

That is, if the inventors were not found the methods for efficiently causing a Cu-Zn, Cu-Sn or Cu-Zn-Sn alloy to contain

carbon, it was not possible to obtain a copper base alloy consisting essentially of at least one of 8 to 45 wt% of zinc and 0.2 to 12.0 wt% of tin, 20 to 1000 ppm of carbon, and the balance being copper and unavoidable impurities.

EP 0872564 discloses copper based alloys consisting essentially of 15 to 35 wt% of Zn, 7 to 14 wt% of Ni, 0.1 to 2 wt% or less of Mn, 0.01 to 0.5 wt% of Fe, 0.0005 to 0.1 wt% of P, at least one element selected from the group consisting of 0.001 to 0.9 wt% of Si, 0.0003 to 0.02 wt% of Pb, and 0.0003 to 0.01 wt% of C, the total content of the selected at least one element being limited to a range of 0.0006 to 0.9 wt%, and the balance of Cu and inevitable impurities. That is, the copper based alloys disclosed in EP 0872564 are Cu-Zn-Ni-Mn-Fe-P alloys which contain Zn, Ni, Mn, Fe and P as essential elements. However, EP 0872653 fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities. Therefore, EP 0872564 fails to disclose or suggest any copper base alloys as set forth in claims 1, 17 and 20, and also fail to disclose or suggest any copper base alloys containing at least one of other additives as set forth in claim 2.

Claims 1-4 and 16-20 were rejected under 35 U.S.C. §103 as being unpatentable over JP 04013825, EP 0411882 or USP 6471792, and claims 2, 16, 18 and 19 were rejected under 35 U.S.C. §103 as being unpatentable over EP 0872564.

JP 04013825 discloses Cu alloys containing 28 to 33 wt% of Zn, 4 to 5.5 wt% of Al, 2 to 3 wt% of Ni, 1 to 2 wt% of Ti and 0.01 to 0.2 wt% of C, and the balance being copper and

unavoidable impurities. That is, the Cu alloys disclosed in JP 04013825 are Cu-Zn-Al-Ni-Ti alloys which contain Zn, Al, Ni and Ti as essential elements. However, JP 04013825 also fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities. Therefore, JP 04013825 fails to disclose or suggest any copper base alloys as set forth in claims 1, 16-18 and 20, and also fails to disclose or suggest any copper base alloys containing at least one of other additives as set forth in claims 2 and 19.

EP 0411882 discloses copper-base alloys consisting essentially of 5 to 30 wt% of Ni, 0.5 to 3 wt% of B, 1 to 5 wt% of Si, 4 to 30 wt% of Fe, at least one of 3 to 15 wt% of Sn and 3 to 30 wt% of Zn, and the reminder being Cu and unavoidable impurities. That is, the copper-base alloys disclosed in EP 0411882 are Cu-Ni-B-Si-Fe-Sn, Cu-Ni-B-Si-Fe-Zn or Cu-Ni-B-Si-Fe-Sn-Zn alloys which contain Ni, B, Si, Fe and at least one of Sn and Zn as essential elements. However, EP 0411882 fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities.

USP 6471792 discloses an alpha brass (copper/zinc alloy with less than 39%, by weight, of zinc) stock alloy. However, USP 6471792 also fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities.

Therefore, it would not have been obvious to one of ordinary skill in the art to make any copper base alloys as set

forth in claims 1-4 and 16-20, because it was difficult to cause the copper base alloys to easily contain carbon prior to the filing of the instant application since the degree of solid solution of carbon in copper is usually small and since the difference in specific gravity between carbon and copper is great.

Claim 4 was rejected under 35 U.S.C. §103(b) as being unpatentable over references as applied to claims above, and further in view of JP 2002285263 or GB 2063912.

JP 2002285263 discloses a brass with an apparent Zn content of 37 to 50 wt% and Sn content of 0.5 to 7 wt%. However, JP 2002285263 fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities.

GB 2063912 discloses an alpha brass alloy containing from 20 to 35% by weight of zinc, 0.05 to 2.0% by weight of tin and 0.05 to 3.0% by weight of silicon. However, GB 2063912 also fails to disclose or suggest any copper base alloys consisting essentially of at least one of zinc and tin, a small amount of carbon, and the balance being copper and unavoidable impurities.

Therefore, it would not have been obvious to one of ordinary skill in the art to make any copper base alloys as set forth in claim 4, because it was difficult to cause the copper base alloys to easily contain carbon prior to the filing of the instant application since the degree of solid solution of carbon in copper is usually small and since the difference in specific gravity between carbon and copper is great.

Accordingly, it is believed that claims 1-4 and 16-20

patentably distinguish the invention from the prior art.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,

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I, Rachel Piscitelli, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on October 12, 2005.

Rachel Piscitelli